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(71) Applicant
Finanziaria Lucchese SpA, (Italy),
Viale Carducci 13, 55100 Lucca, Italy

(72) Inventor
Fabio Perini

(74) Agent and/or address for service
Stanley Popplewell Poole, 57 Lincoln's Inn Fields,
London, WC2A 3LS

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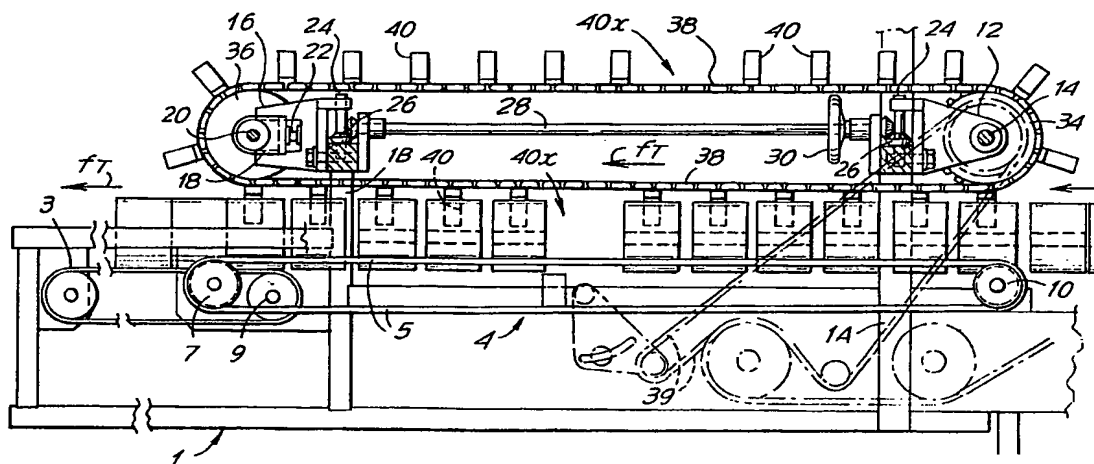
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B4B

(54) A Device for Removing Scrap

(57) A device for removing scrap ends (Rx, Ry, Fig. 4) or trimmings from cylinders B of paper cut into rolls R for toilet paper or the like by a cutter (L, Fig. 4) wherein, the rolls are advanced in their axial direction between a lower bearing guide 5 on one side and upper lugs 40 supporting each roll R and moving with the rolls R. The lugs 40 are regularly spaced to cooperate with rolls and a gap 40X is provided to coincide with the ends of the cylinders where the trimmings Rx, Ry are present, so that the trimmings Rx, Ry are unsupported and fall away from the guide 5.

Fig. 1



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Fig. 1

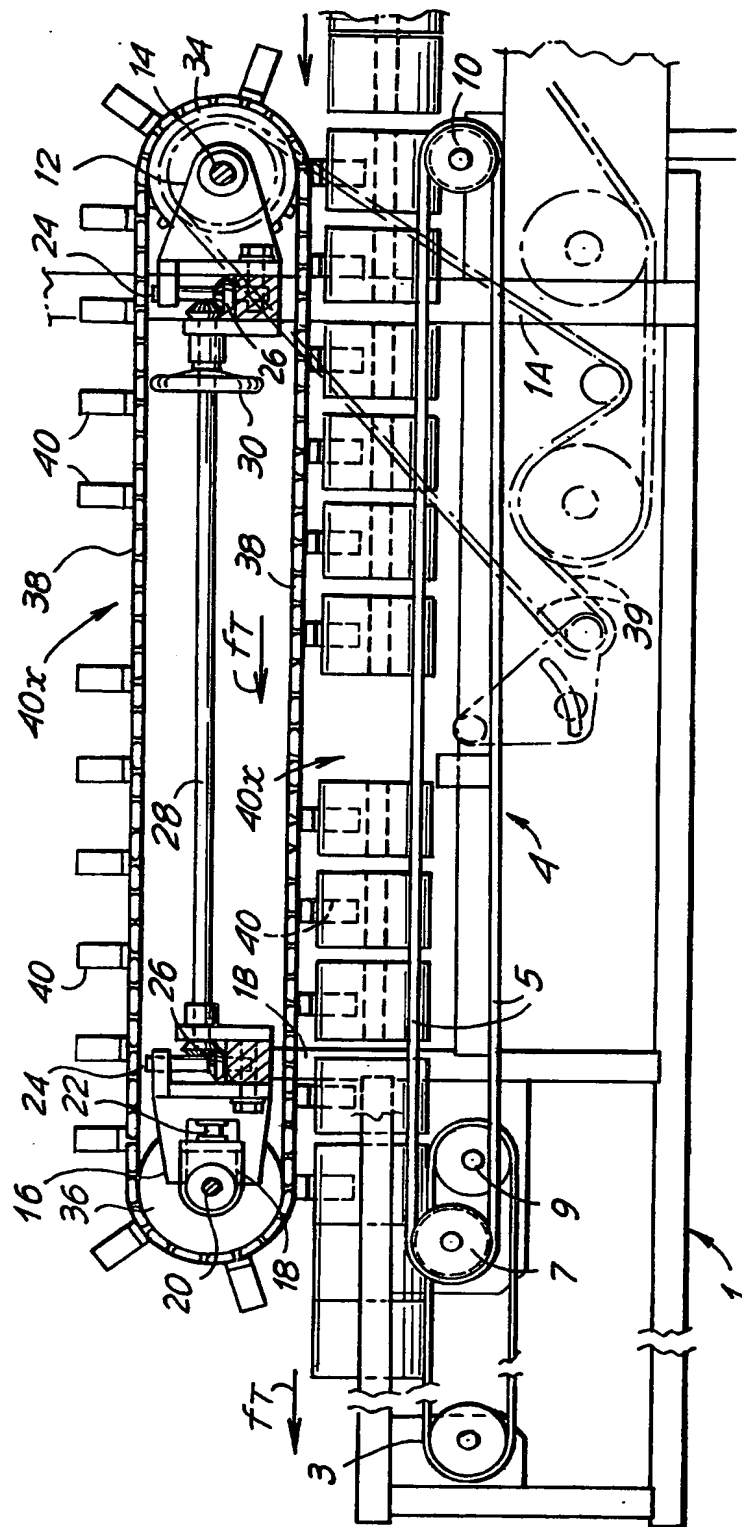


Fig. 2

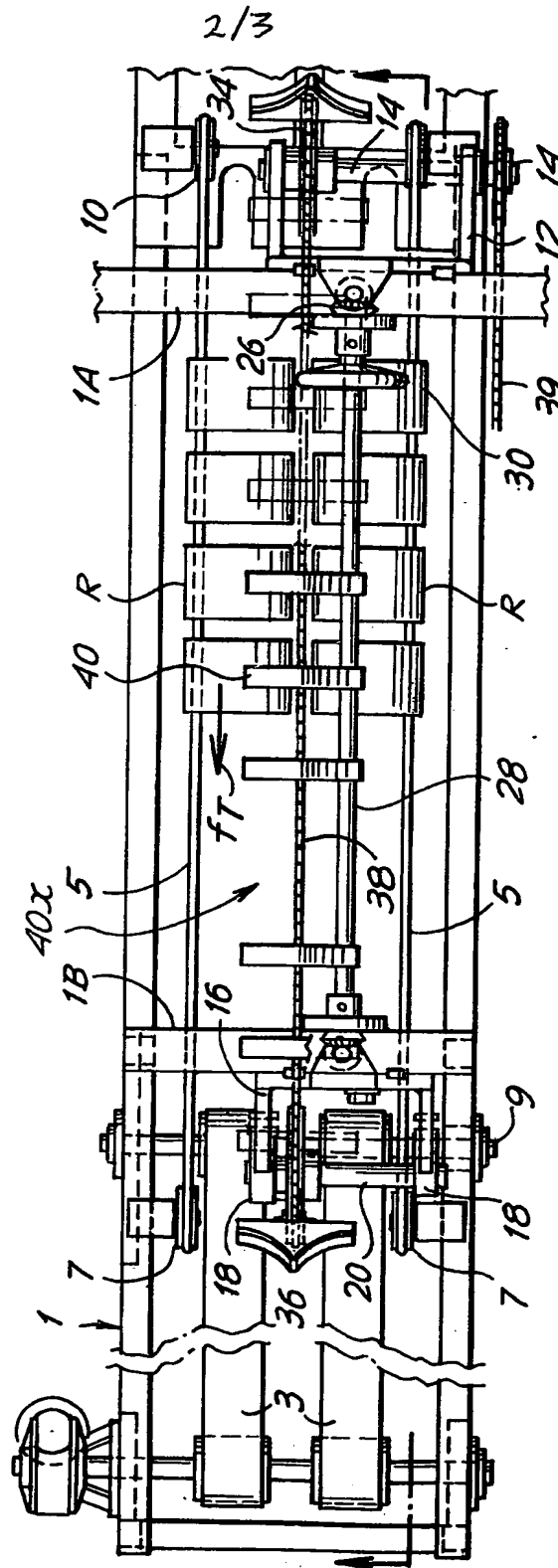


Fig. 3

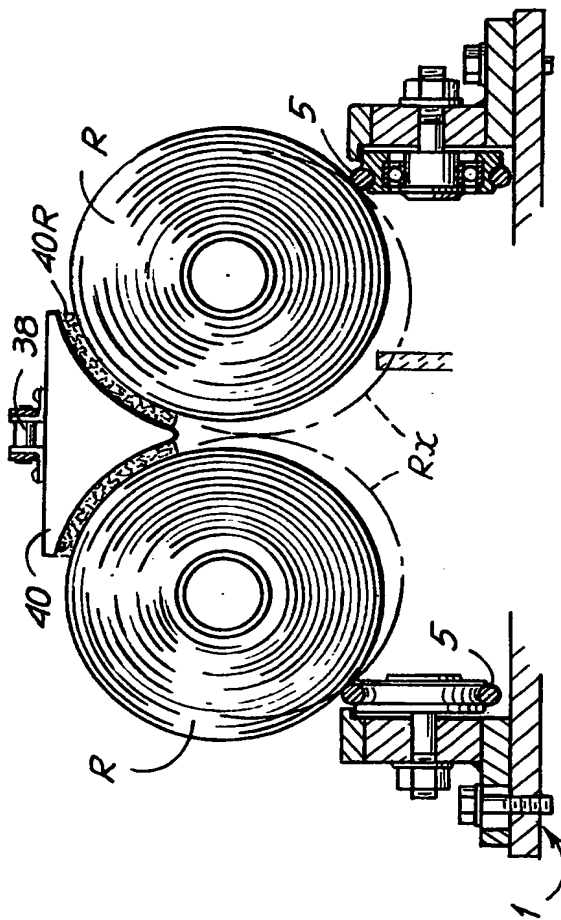
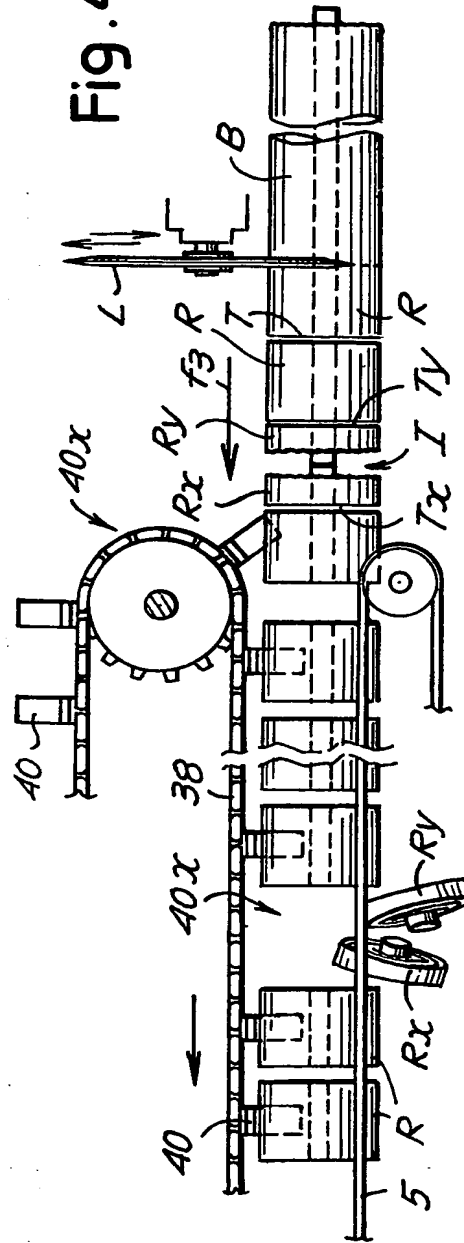


Fig. 4



SPECIFICATION

A Device for Removing Scrap Ends or Trimmings from Cylinders of Paper Cut into Rolls for Toilet Paper or the like.

5 This invention relates to a device for removing scrap ends or trimmings from cylinders of paper cut into rolls for toilet paper or the like.

In order to produce rolls of toilet paper or absorbent napkins for use in the kitchen or the like, rolls or cylinders of paper are formed on cores having a certain length and are then cut, by a cutting machine or the like, to form rolls of the desired length. During this latter operation the ends of the cylinder leave scrap portions or trimmings comprising a piece of core projecting from a discoid representing the end of the wrapped paper and bounded by the first or the last cut through the cylinder. The trimmings must be removed in a completely reliable manner to prevent them reaching the packing machine to which the rolls are sent since otherwise the machine may become jammed and in any case there will be intolerable irregularities in the packed products. Of course, removal should be as automatic as possible to avoid the presence or responsibility of an operator.

The invention relates to a device which is disposed between a cutting machine— which cuts the cylinder into rolls—and one or more channels for removing the rolls towards a packing machine or other unit for processing and storage. The device in question eliminates the irregularity and difficulties of existing devices, which usually comprise a pair of longitudinal bearing guides along which the rolls move, one guide having a gap so as to drop any article having a length shorter than a roll.

According to the invention, the device for removing trimmings is characterised in that the rolls bear and move on a bearing guide disposed on one side whereas on the other side they bear on upper lugs or the like which move in translation with the rolls, whereas the trimmings are unsupported and consequently fall out of the guide. Preferably, the lugs or the like are missing at the abutting ends of adjacent cylinders cut into rolls, at the place where the trimmings are present, so that the trimmings are not supported.

The lugs may be borne by a continuous chain or similar element.

Optionally, each roll bears on an arcuate surface of the lug covered by a soft layer so as to compensate at least partly for variations in diameter of the rolls.

More particularly when the device is associated with a machine for cutting two rows of cylinders (and therefore rolls), optionally, two bearing guides are provided for two rows of rolls which are subsequently borne by lugs, having a symmetrical shape and in symmetrical position relative to the two bearing guides and the two rows of rolls. Optionally, the two bearing guides are on the outside and the symmetrically shaped lugs comprise a single member having a point or

65 the like to form two opposite bearings, or the two bearing guides can be on the inside and the lugs can be on the outside.

Optionally, the guides comprise moving belts.

In one possible embodiment, the lugs are moved intermittently and so is the row or rows of rolls coming from the cutting machine. According to an alternative feature, the lugs and the lateral bearing guides are moved continuously.

Optionally, the bearing guides, comprising moving belts, and the lugs are driven at a higher speed than the rolls coming from the cutting machine.

The invention will be further described by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is a diagrammatic side view of a device according to the invention;

Fig. 2 is a diagrammatic plan view of the device of Fig. 1;

Fig. 3 shows a partial cross-section of the device of Fig. 1, and

Fig. 4 is an explanatory diagram showing the operation of the device of Fig. 1.

As shown in the accompanying diagrams, a device 1 disposed downstream of a cutting machine for removing rolls comprises continuous conveyors 3, shown in the form of two belts in the drawings, which receive the two rows of rolls coming from the cutting machine in the direction of arrow f3 (Fig. 4). Conveyors 4 are disposed upstream of conveyors 3. Advantageously, conveyors 3 and 4 are driven in translation in the direction of arrow fT so that the two rows of rolls advance at a spacing from one another, the spacing being obtained by moving at a higher speed than that at which the cylinders and rolls formed therefrom advance intermittently in the cutting machine. Conveyors 3 may likewise advance intermittently or may move continuously.

Near the inlet end of the guides or conveyors supplying rolls R, the outlet ends of two continuous annular belt conveying means 5 forming part of the conveyors 4 are disposed alongside and outside of the rolls R. Belts 5 are guided by grooved wheels 7 whose axis is parallel and relatively near to the axis 9 of the pulleys guiding conveyors 3. Belts 5 are also guided in grooved wheels 10. Actuating means (not shown) are provided for continuously or intermittently driving belts 5, the motion being in all cases synchronized with the motion of the means for supplying the rolls and the scrap portions to be removed therefrom.

A continuous conveying structure comprising lugs, to be described at greater length hereinafter, is disposed above and on the inside of belts 5. A support 12 for a shaft 14 extending towards the outlet end of the device is mounted on a gantry structure 1A extending from the frame 1, whereas a second support 16 is disposed on a second gantry 1B opposite the grooved wheels 7 and guide shaft 9, the support 16 being adapted to adjust the position of projections 18 for holding a shaft 20 so as to adjust the centre to centre

distance of shafts 14 and 20 for purposes described hereinafter. The adjustment is made for example by a screw 22 and lock-nut. Supports 12 and 16 are vertically adjustable in position, are guided by moving vertically on gantries 1A and 1B respectively and can be secured or adjusted on vertical threaded rods 24 which engage threaded holes or nuts in supports 12, 16 respectively. Rods 24 can be rotated via pairs of toothed bevel gears, using a common longitudinally extending shaft 28 operated by a handwheel 30. It is thus possible to adjust the level of the two shafts 14, 16 relative to structure 1 and consequently relative to conveyors 3 and particularly to conveyors 5. Projections 18 can be adjusted so as to adjust the distance between the centres of shafts 20 and 14. Shaft 14 bears a chain wheel 34 and shaft 20 bears a chain wheel 36, the two serving to guide a chain 38, the length of which can be modified. The chain may be replaced as required during operation, i.e. in practice in dependence on the axial length of the rolls to be manipulated. Shaft 20 or more particularly shaft 14 can be actuated e.g. via a chain transmission (general reference 39). At equidistant positions, chain 38 carries attachments 40, each having a pointed cross-section with arcuate concave edges, advantageously covered by a soft layer 40A. The concave cross-sections of attachments 40, in co-operation with the soft layers 40A, adapt to the curvature of the moving rolls with a tolerance as regards the radii of curvature of the outer cylindrical surfaces of the rolls, for purposes described hereinafter. Attachments 40 constitute lugs or the like for retaining rolls R, which are moved forward intermittently or continuously in the direction of arrow f3 by feed means in the cutting machine or by other means conveying them to belts 5 and to the bottom row of lugs 40. The cross-section shows the relative position of belts 5, rolls R—which move forward in two rows side by side and at a limited space apart—and lugs 40, which extend along the bottom branch of chain 38. Lugs 40 are disposed at intervals roughly corresponding to the spacing between adjacent rolls R advancing at intervals in two rows, the rolls in the two rows being side by side so as simultaneously to make contact with the same lug 40 when the pair of rolls in question are at a central longitudinal position. Consequently, since the distance between the top runs of the two belts 5 is greater than the centre to centre distance between pairs of side by side rolls in the two advancing rows, the two rolls are supported on the top and partially inside the upper runs of belts 5, whereas their inner upper cross-section bears against the respective soft layers 40A on the lugs opposite the pair of rolls in question. The arrangement is such that the distance between the top runs of belts 5 is greater than the sum of the diameters of the pair of side by side rolls. In all cases, each roll is disposed between a lug and the top run of one of belts 5. Belts 5 and chain 38 are moved forward in perfect synchronism, either continuously or intermittently and preferably at an

average speed greater than the speed of advance of the rolls in the cutting machine, from which they arrive in the direction of arrow fT.

As shown more particularly in Figs. 1 and 4, chain 38 has an irregularity, i.e. the absence of a lug 40 in at least one position 40X. The two lugs adjacent position 40X, at which a lug is missing, are separated by twice the distance between the other lugs. Consequently, if a roll R moves past position 40X it will fall as soon as it loses contact with the conveyor which brought it. Chain 38 is adjusted and phased in accordance with the gap between rolls advancing in the same row, so as to position the lugs opposite the rolls and more particularly near the centre thereof. In addition, the chain must be such that the or each irregular position 40X corresponds to the position of the abutting ends of two contiguous cylinders in the cutting machine. Consequently the absence of a lug in position 40A will correspond to the space between cuts TX and TY (see Fig. 4) made by the cutting machine on the end portion of a preceding cylinder and on the initial portion of the following cylinder. Cuts TX and TY are separated by the same spacing as between the ends of each roll R. As is known, cut TX and cut TY, which are made by blade L in the same manner as the cuts T for separating rolls R from one another in cylinder B, result in the formation of two scrap portions or trimmings RX and RY respectively. Consequently, the pairs of scrap portions RX and RY, when they advance in the direction of fT and make contact with the upper branches of the corresponding belts 5, will not bear against a lug since they are opposite the irregular position 40X where a lug 40 is absent. Consequently, trimmings RX and RY fall between the two belts 5 whereas the pairs of regular rolls R move forward since they are supported by belts 5 on the outside and at the bottom and by the concave cross-sections of lugs 40 on the inside and at the top, until they are brought to the downstream processing machines.

In adjacent cylinders, the cores usually project to a limited extent and abut and, in co-operation with the axial ends of the reels of paper on the two cylinders, define a limited, relatively constant space slightly less than the axial dimension of a roll, thus limiting the amount of scrap represented by the two trimmings RX and RY cut at TX and TY. Consequently the two trimmings RX and RY arrive at the bottom branch of chain 36 at a distance from one another, before they fall from the side through lack of support, owing to their limited axial length. Owing to the space between scraps RX and RY, they are likely to fall even in the presence of a lug 40. However, the irregular absence of a lug at a position 40X (corresponding to the position in which the scraps RX and RY arrive at the beginning of the bottom branch of chain 38) is a very reliable means of preventing a scrap portion from bearing against a lug and continuing to move forward with the rolls to be packed.

In order to adapt the device to the diameter of the rolls in the two advancing rows, the height of

shafts 14 and 20 can be adjusted until lugs 40 are at suitable levels along the bottom run of chain 38, thus providing lateral support for the rolls. Alternatively, grooved wheels 7 and 10 can be moved transversely into a position at which the two belts 5 are a suitable distance apart for supporting the rolls. The distance between the top runs of belts 5 should be sufficiently greater than the sum of the diameters of two rolls advancing side by side to ensure that two scraps or trimmings do not support one another and remain side by side when they fall. However, this may also be avoided in placing an obstacle under the rolls which continuously advance and are supported by belts 5 and by the lugs. The obstacle acts on the scraps, which fall in contact with one another when the distance between belts 5 along the top run is less than the sum of the diameters of the two side by side rolls or trimmings.

The upper runs of the two belts 5 will be suitably held to prevent them moving apart.

With regard to the distance between lugs, chains 38 and lugs 40 must be adjusted to the spacing between contiguous rolls advancing each of the two rows. This may necessitate varying the position of the lugs on the chain or replacing the chain by different chains, as can be done by adjusting the distance between the centres of shafts 14 and 20 and/or the wheels by chain 34 and 36.

Of course, the drawings show only one embodiment, given only as a practical demonstration of the invention, which can be varied in its form or features without thereby departing from the scope of the invention which is defined in the accompanying claims.

CLAIMS

1. A device for removing trimmings from cut rolls, such as residues of rolls or cylinders of paper wrapped on cores and cut into rolls of toilet paper or wipes or the like by cutting machines or the like, during the advance of the rolls from the cutting machine, the rolls being disposed in a line, comprising means for moving the rolls between a bearing guide disposed below and to one side of the centre of the rolls, and upper lugs or the like disposed above and to the other side of the centre of the rolls, which lugs move in translation with the rolls, whereby each roll is supported between a said lug and the bearing guide whereas the trimmings will be unsupported and consequently fall from the guide.

2. A device according to claim 1, characterised in that the lugs or the like are substantially evenly spaced but a gap is provided to coincide with the abutting ends of adjacent cut cylinders where the

trimmings are, so that a trimming is not supported by a lug.

3. A device according to claim 1 or 2, characterised in that the lugs are carried by a continuous chain, belt or similar element.

4. A device according to claim 1, 2 or 3, characterised in that each lug has an arcuate surface covered by a soft layer for cooperating with and supporting a roll.

5. A device according to any one of claims 1 to 4, characterised in that two bearing guides are provided for supporting two rows of rolls, and the lugs are disposed symmetrically with respect to the guides for supporting the rows of rolls.

6. A device according to claim 5, characterised in that the two bearing guides are outward of the rolls and the lugs are symmetrically shaped and comprise a single cusp-shaped or pointed member forming two bearing surfaces.

7. A device according to claim 5, characterised in that the two bearing guides are inside of the rolls and the lugs are on the outside.

8. A device according to any one of the preceding claims, characterised in that the bearing guides comprise moving belts.

9. A device according to any one of the preceding claims, characterised in that the lugs and the row or rows of rolls coming from the cutting machine are moved intermittently.

10. A device according to any one of claims 1 to 8, characterised in that the lugs and the lateral bearing guides are moved continuously.

11. A device according to any one of claims 1 to 8, characterised in that the bearing guides, comprising moving belts, and the lugs are driven at a higher speed than the speed of rolls coming from the cutting machine.

12. A method of removing end trimmings from a cylinder which has been cut into discrete lengths or rolls, comprising moving the cut cylinder in its axial direction between a lower support located below and to one side of the axis of the cylinder and an upper support located above and to the other side of the axis of the cylinder, one of said supports comprising a plurality of discrete members each arranged to engage and move with a said roll to support it between the member and the other support.

13. A method as claimed in claim 12, wherein the lower support is continuous and moves with the rolls.

14. A device for removing scrap ends or trimmings from cylinders of paper cut to form toilet rolls or the like, substantially as hereinbefore described with reference to the accompanying drawings.